STUDIES ON AVIAN CESTODES FROM CHINA.

PART II.
CESTODES FROM CHARADRIIFORM BIRDS.

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(With Figures 38–54 in the Text.)

Part I of these studies on the cestodes from Charadriiform birds of China appeared in this *Journal* in March 1932[1]. Here nine more species of the same lot from Peking are dealt with. The names of hosts, specimen numbers, and the month in which they were collected are stated in Part I.

Family *HYMENOLEPIDIDAE*.

Genus **Haploparaxis** Clerc.

Haploparaxis sinensis n.sp. (Figs. 38–41).

Host: *Scolopax rusticola*.

Locality: Peking, China.

Specimen: Pe 751.

Tube Pe 751 contained two kinds of slender tapeworms, mostly with rostellum bearing ten hooks, characteristic of *Haploparaxis*.

Length 140 mm., breadth 1 mm. Scolex 0·276 mm. in diameter; rostellum 0·171 × 0·102 mm.; sucker 0·084–0·100 mm. in diameter; ten rostellar hooks 0·027–0·036 mm. long; rostellar sac 0·1596 mm. long, extending a little beyond sucker. Neck present. Young segment measuring 0·1482 × 0·0114 mm., mature segment 0·850 × 0·153 mm., gravid segment 0·986 × 0·221 mm. Genital pore unilateral, at middle of proglottis margin. Cirrus sac long, 0·285 × 0·022 mm., extending medially half-way between the middle line of the proglottides and poral excretory vessels or passed beyond the former. Testis single, 0·342 mm. in diameter. External seminal vesicle extending from internal end of cirrus pouch, first short and narrow, later swelling up into a globular sac overlain ventally by ovary. Ovary lobed, 0·228 mm. in transverse diameter, situated between testis and vitelline gland. Form of vitelline gland and ovary changeable in successive mature segments. Vagina running inward dorsally to cirrus sac, near poral lobe of ovary forming into seminal receptacle. Dorsal excretory vessel (0·020 mm. diam.) and ventral excretory vessel (0·028 mm.) passing dorsally to genital ducts. Uterus sac-shaped. Onchospheres of two shells:

[1] Tseng, S., *Parasitology*, **24**, 87–106, with Figures 1–37 in the text.

external shell rounded in young state, lemon-shaped in mature stage, armed with two polar plugs, measuring 0·052 × 0·043 mm. Internal shell always rounded, 0·032 mm. in diameter. Embryo 0·028 mm. diam. and embryonal hooklets 0·016 mm. long.

Up to now the number of species of *Haploparaxis* Clerc, has increased to sixteen. For chief characters of different species see Table II. According to previous authors, rostellar hooks, internal longitudinal muscles, cirrus pouch and eggs were considered as principal of characteristics in classifying species. In spite of the great similarities in the forms of the rostellar hooks in most species of *Haploparaxis*, they remain of primary importance in classification. The number of external longitudinal muscles in *Haploparaxis* spp. is comparatively constant, while that of the internal longitudinal muscles is very variable, ranging from 8, 12, 16, 18, 20, 24, 30, 38, 40, 50, to 60. Their cirrus pouches may be divided into three distinct categories: *H. penetrans*, *H. crassirostris*, *H. pseudofilum*, *H. fuligulosa*, *H. australis*, *H. larina* and *H. birulai* all have a small cirrus pouch, less than one-third the width of proglottis; while the cirrus pouch in *H. cirrosa* and *H. hirsuta* extends medially to the excretory vessel of the antiporal side. The other species such as, *H. filum*, *H. brachyphallos*, *H. elisae*, *H. dujardinii*, *H. diminuens* and *H. sinensis* this organ is of moderate length, *i.e.* it extends up to the middle line or beyond.

The eggs of *Haploparaxis* spp., as indicated by Clerc (1903), seem to have three forms: *H. cirrosa*, *H. crassirostris*, for instance, have rounded eggs, *H. pseudofilum* has eggs devoid of the same distinguishable polar thickness as found in eggs of *H. filum* (as outlined by Clerc, 1903, in text-figs. 2, 3). Since then, Johnston was the only worker who pointed out in describing *H. australis* that his species has eggs resembling those of *A. filum* and figured one egg (fig. 31, pl. XVI, 1911) with polar thickness more prominent than Clerc's figure. In carefully examining the eggs of *H. sinensis* in the hope of determining their special form, I was surprised to find that all three forms are represented, as shown in Fig. 41, *a*, *b*, *c* (drawn under camera lucida): *a*, with external shell round; *b*, with two polar thickenings less developed than in *c*, but on one extremity, at the side of polar plug, a slight slit can be seen. The polar plugs appear completely formed in well-matured eggs (*c*). This slit around the polar plugs will facilitate the exit of the embryo.

Hymenolepis himantopodis (Krabbe 1869).

Host: *Totanus calidris*.

Locality: Peking, China.

Specimen: Pe 1459.

Length 70 mm., maximum breadth 1·5 mm., each proglottis broader than long. Scolex 0·364 × 0·228 mm., rostellum 0·060 mm. diam., rostellar sheath small and short, 0·160 mm. long; neck present, about 0·285 mm. long; suckers, 0·128–0·132 mm. diam., slightly projecting from surface; ten to twelve rostellar hooks, 0·009 mm. long. Cirrus sac narrow, in mature proglottides half-

way across their width (agrees with Meggitt's description, 1927). Vagina parallel to cirrus sac posteriorly. Receptaculum seminis small. Ovary elongated transversely, its position rather variable. Vitelline gland 0·1026–0·114 × 0·0456–0·0680 mm., irregular form, ventral to ovary. Testes large, 0·064 mm. diam., arranged in a transverse row.

Hymenolepis nitida (Krabbe 1869) Clerc 1902 (Fig. 42).

Syn.: *Taenia nitida* Krabbe 1869.
Echinocotyle nitida Clerc 1902.

Host: *Tringa* spp.

Locality: Peking, China.

Specimen: Pe 828.

In tube Pe 828 were found a few scolices. The scolices appear identical with those in the present species.

Scolex 0·192 mm. diam., measuring on level of suckers; rostellum 0·156 × 0·060 mm.; suckers 0·128–0·140 × 0·068–0·076 mm.; neck 0·060 mm., in width; 1st segment 0·120 × 0·020 mm. ten rostellar hooks, 0·076–0·080 mm. long. Acetabular hooks present, arranged in four rows on the lateral edges of suckers, two or one on the posterior and anterior edges, and three or four at their bases.

Hymenolepis sp. (Fig. 43).

Host: *Tringa* sp.

Locality: Peking, China.

Specimen: Pe 828.

In company with a few scolices of *H. nitida* were found some deep black strobilae which, after being treated with solutions for dispigmentation, show three testes (0·086 mm. diam.) arranged nearly in a transverse line. Notwithstanding that the other structures are not clearly observed, some observations regarding anatomy may be mentioned here. The genital pore is sub-marginal and unilateral. The edge of the genital aperture is furnished with a row of hooklets (0·0054 mm. long). In the genital atrium, the vagina, when

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Legends to Figs. 38–46 and 54.

Figs. 38–41. *Haploparaxis sinensis* n.sp. (38) Scolex and portion of strobila. (39) Rostellar hooks. (40) Mature segment. (41) Different stage of egg: *a*, egg with external shell rounded; *b*, egg with polar thickness not well developed; *c*, egg with polar plugs completely formed.

Fig. 42. *Hymenolepis nitida* (Krabbe). Scolex showing rostellum mounted with hooks and suckers armed.

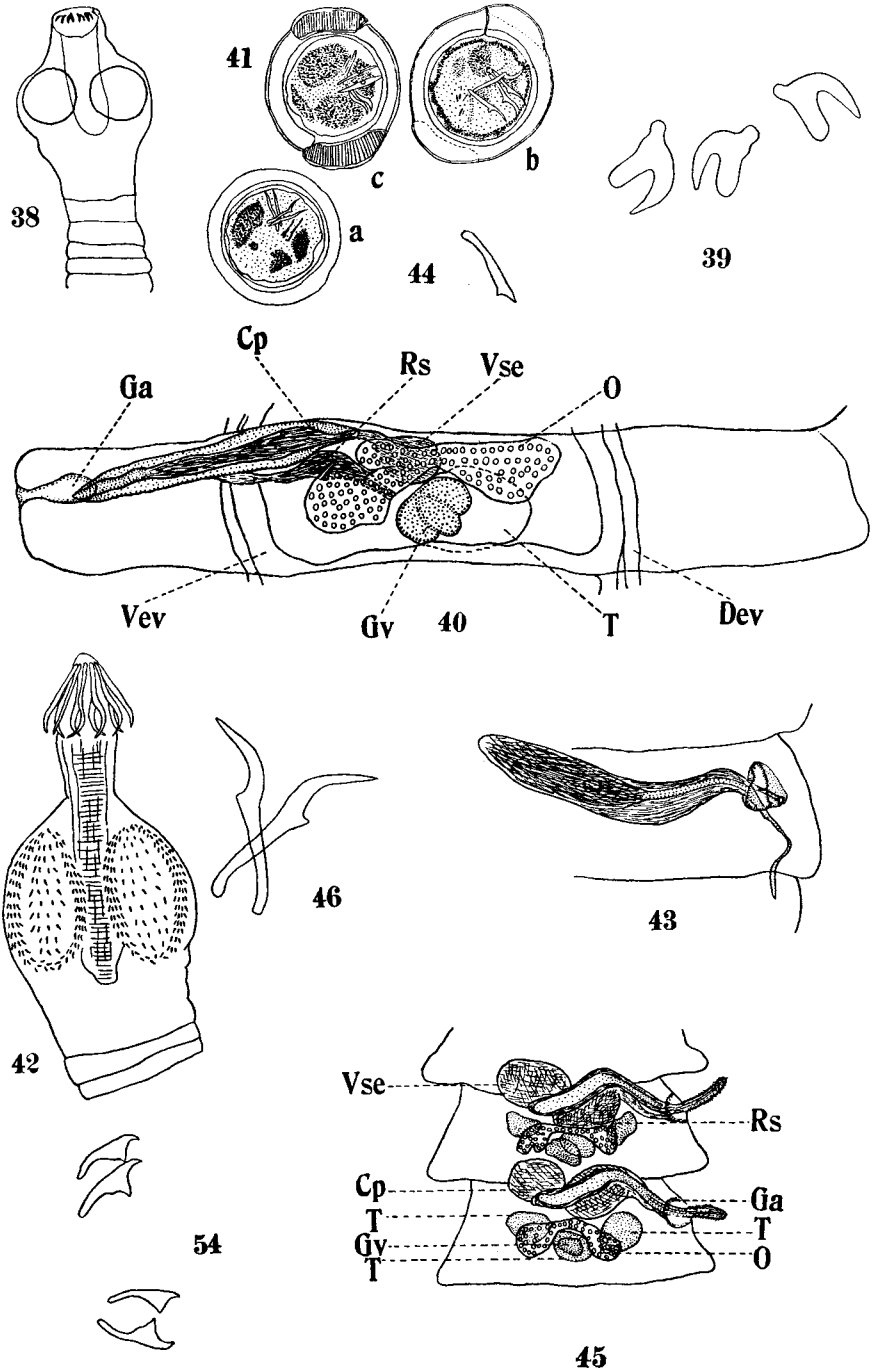
Fig. 43. *Hymenolepis* sp. Portion of mature segment showing genital atrium armed with delicate hooklets at its edge and cirrus protracting into the successive segment.

Fig. 44, 45. *Fuhrmanniella clerci* n.sp. (44) Rostellar hooks. (45) Mature segments.

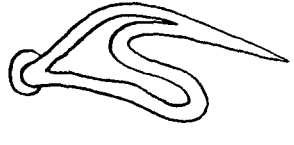
Fig. 46. *Fuhrmanniella uralensis* (Clerc). Rostellar hooks.

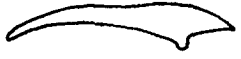
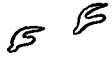
Fig. 54. Rostellar hooks of a tapeworm from the liver of *Totanus calidris*.

Lettering to figures: *Cp.* Cirrus pouch; *Dev.* Dorsal excretory vessel; *Ga.* Genital atrium; *Gv.* Vitelline gland; *O.* Ovary; *Rs.* Receptaculum seminis; *T.* Testes; *Vev.* Ventral excretory vessel; *Vse.* External seminal vesicle.



Species of Haploparaxis from Birds

Species	Hooks: No.	Hooks: Size (mm.)	Hooks: Form	Internal longitudinal muscles	Cirrus pouch	Eggs	Host	Locality
H. furcigera Duj. 1845 (*T. rhomboidea*, Krabbe 1869	10	0·048–0·056 or 0·065–0·066 long		8 bundles	—	0·036 mm. diam. embryonal hooklets 0·014 mm.	*Anas crecca, Anas boscas, Nyroca ferina*	Northern Europe and Turkestan
H. penetrans Clerc 1902	10	0·040 long		50–60	Small, less than 1/3 width of segment	Middle shell devoid of thickness	*Tringa minuta Gallinago gallinago*	Ural
H. crassirostris Clerc 1903 (Krabbe 1869)	10	0·033 long		24–30	,,	,,	*Charadrius, Squatarola, Scolopax, Phalaropus, Tringa, Tringoides, Totanus, Gallinago*	Europe
H. pseudofilum Clerc 1902	10	0·017–0·019 long		12–18	,,	Without sharp demarcation of polar thickness at middle shell	*Tringa, Totanus*	Ural
H. filum Clerc. 1903 (*T. filum* Gœze 1782)	10	0·017–0·0185 long		On both dorsal and ventral side 5–7 between excretory vessels and 1–2 lateral to them	Very large, extending to middle line or beyond	Three shells, of which the middle one thick and furnished with ring-like thickness at each end	*Arenaria, Phalaropus, Tringa, Tringoides, Totanus, Numenius, Scolopax, Gallinago*	Northern Europe and Italy
H. cirrosa Clerc 1903 (*T. cirrosa* Krabbe 1869)	10	0·024 long		16–18	As large as that of *H. hirsuta*	?	*Larus minutus, L. canus, L. ridibundus, Sterna hirundo*	Northern Europe
H. brachyphallos (Krabbe 1869) (*H. brachyphallos* Fuhrm, *Skorikowia clausa* von Linst, *Diorchis serpentata* von Linst)	10	0·017–0·018 (0·026) long			Near middle line or beyond	Slightly oval, outer shell 0·036 × 0·034, middle, thick shell 0·026 × 0·021–0·023 mm.	*Charadrius, Tringa, Arquatella*	Northern Europe
H. hirsuta Clerc 1903 (*T. pubescens* Krabbe 1882, *Monorchis hirsuta* Clerc 1902	10	0·037–0·044 long		24–30	Very large, almost reaching excretory vessels of the aporal side	Middle shell devoid of thickness	*Totanus, Gallinago*	Europe

H. fuligulosa Soloviow 1911	?				0·073 × 0·0932–0·0139 – 0·019 mm.	0·0559 mm. diam. hooklets 0·0139–0·0163 mm. long	*Fuligula cristata*	Europe
H. larina Fuhrm. 1920	10	0·216–0·023 long		10 dorsal, 10 ventral (6 between excretory vessels and 2 lateral on each side	A little passed excretory vessels	0·024 mm. diam., outer shell 0·04 mm. diam.	*Larus dominicanus*	South Pole
H. murmanica Baylis 1919	10	0·065 long		—	—	0·020 mm.	*Somateria mollissima*	Murman coast (Arctic Russia)
H. elisae Skrjabin 1914	10	0·0259 long		—	0·25–0·26 × 0·023–0·025 mm. reaching middle line	0·026–0·003 mm.	*Fuligula nyroca*	Russian Turkestan
H. australis Johnston 1911	8	0·19–0·22 long		Few but larger	Short 0·045 mm.	Egg like that of *H. filim*, 0·057 × 0·042 mm., onchosphere 0·034 × 0·025 mm. hooklets 0·15 mm. long	*Gallinago australis*	North Queensland (Australia)
H. dujardinii (Krabbe 1869) Clerc 1903	46	0·016–0·018 long		50–60	Long	3 shells, 2 internal rounded, external variable	*Sturnus vulgaris*	Northern Europe
H. birulai v. Linstow 1905	10	0·032 long		38?	Nearly 1/3 width of proglottides	0·040 × 0·034 mm.	*Erionetta spectabilis*	Russia
H. diminuens v. Linstow 1905	10	0·0143 long		41?	More than half width of proglottides	Outer shell 0·047 × 0·031 mm., inner 0·031 × 0·029 mm.	*Crymophilus fulicarius*	Russia
H. sinensis mihi	10	0·27–0·36 long		2 lateral, 3–5 medial to excretory vessels on both dorsal and ventral sides	0·285 × 0·027 mm. extending to middle line or beyond	Onchosphere 0·0288 mm., hooklets 0·0162 mm.	*Scolopax rusticola*	Peking, China

protruded, can sometimes be seen also armed with delicate spines only at the end. From the atrium a long and large cirrus pouch (0·220 × 0·024 mm.) extends inwards across the entire width of segment, the pouch being longer than that of *H.* (*E.*) *nitida* (*fide* Clerc, 1903, p. 313: "La poche du cirrhe se continue à peu près jusqu'au centre du proglottis.") Sometimes the cirrus pouch bends towards itself midway or runs obliquely directing its aporal extremity into the preceding segment. The inside of the cirrus pouch is mostly occupied by the seminal vesicle. The penis, when protruded, can be seen penetrating into the parenchyma. Under this condition, it may be expected that fecundation would have occasionally taken place through the parenchyma. No accessory sacculus, similar to those described by Clerc in certain *Echinocotyle*, has been detected so far as I am aware.

Hymenolepis sp.

Host: *Gallinago media.*
Locality: Peking, China.
Specimen: Pe 748.

Tube Pe 748 contained two tapeworms of which all the rostellar hooks are gone and the strobilae are much macerated. The present specimen possess three testes 0·017 mm. in diam., arranged in two poral and one aporal or two lateral and one middle. Genital pores are unilateral and the cirrus sac measures 0·342 mm. long across one-third the transverse diameter of the proglottis. Other details can not be satisfactorily seen.

Weinlandia styloides (Fuhrm. 1906).

Syn.: *Hymenolepis styloides* Fuhrm. 1906.
Host: *Rhynchaea capensis.*
Locality: Peking, China.
Specimen: Pe 1490.

Length 20 mm., breadth 0·68 mm. Scolex 0· 1938 mm. diam.; rostellum 0·057 mm. diam., carrying ten hooks, 0·03 mm. long; rostellar sac 0·4278 mm. long; suckers 0·114–0·159 mm. diam. Testes three in number, 0·1 mm. diam. one poral and two aporal, one of the latter anterior to the other. Cirrus pouch 0·255 × 0·068 mm. Eggs 0·044 mm. diam.

So far as the material is serviceable for comparison, the above characters observed are in agreement with *H. styloïdes* Fuhrm, recorded from *Vanellus aegypticus.*

Fuhrmanniella clerci n. sp. (Figs. 44–45).

Host: *Rhynchaea capensis.*
Locality: Peking, China.
Specimen: Pe 750.

Length 60 mm., maximum breadth 1·00 mm., all segments broader than long, genital anlage beginning at about 80th segment. Scolex sub-globular, 0·262 mm. diam.; suckers 0·102 mm. diam.; hooks ten, 0·027–0·0288 mm. long;

rostellar sheath extending backwards just to the posterior side of suckers. Genital pore anterior to centre of proglottis margin. Genital atrium distinguishable, cirrus armed. Cirrus sac long, reaching antiporal testes, across two-thirds of proglottis, bending anteriorly upon itself, length from pore to bend 0·228 mm. from bend to inner extremity 0·168 mm., total 0·396 mm. and maximum breadth 0·060 mm. Testes three, 0·114–0·136 mm. diam., one poral, one middle, one aporal, the lateral two rather forward. Ovary bilobed, poral lobe a little smaller than aporal, situated anteriorly at middle testis. Vitelline gland at ventral side, just under or a little posterior to middle testis. Vagina, dorsal to cirrus sac, bending anteriorly from atrium and swelling into a large receptaculum seminis. Receptaculum seminis 0·205 × 0·17 mm., in front of ovary, at mature segments its anterior side reaching anterior margin of proglottis. Uterus sac-like. Onchospheres with two shells: 1st, 0·025–0·027 mm. diam., 2nd, 0·048–0·054 mm. diam.

Judging from the characters of rostellar hooks alone, the present specimen seems near *H. interrupta* Rud., but its internal anatomy, particularly the disposition of testes, indicates a very characteristic pattern which is closely related to *E. uralensis* Clerc, *H. clausa* v. Linstow, *H. terraereginae* Johnston and *H. fasciata* Rud. They were considered by Mayhew (1924) as "Species inquirendae." If the manner of the disposition of testes plays an important part in the classification of this group of tapeworms, it is necessary to create a new genus, *Fuhrmanniella*, for receiving all the species not yet arrayed with three testes, placed in different planes, two marginal anterior and one median posterior, characters as indicated by Clerc (1903) in studying *Echinocotyle uralensis*. The diagnosis of this new genus is as follows:

> Three testes, the first two arranged in a marginal anterior position and the third, median posterior. Genital pores unilateral. Rostellum armed with a simple crown of hooks. Genital ducts pass dorsally to the longitudinal excretory vessels. Vas deferens with an internal and an external seminal vesicle.
>
> Type species: *Fuhrmanniella uralensis* (Clerc 1902).

In comparison with the above four species, none has any character resembling the present species, except the arrangement of testes.

Fuhrmanniella uralensis (Clerc 1902) (Fig. 46).

Syn.: *Echinocotyle uralensis* Clerc 1902.

Host: *Tringa americana.*

Locality: Peking, China.

Specimen: Pe 884 *a*.

Pe 884 *a* contained only a few scolices with remarkable hooks.

Scolex 0·228 mm. diam.; rostellum 0·126 mm. diam.; rostellar sac 0·171 × 0·045 mm.; suckers 0·084 mm. diam.; neck 0·102 × 0·136 mm.; 1st segment 0·140 × 0·016 mm.; ten rostellar hooks, 0·054–0·057–0·059 mm. long. Acetabular hooks indistinct.

The rostellar hooks of this specimen are similar in shape to those of *E. uralensis* Clerc = *F. uralensis* (Clerc) and of the same size as those of *E. nitidulans* (Krabbe). As the shape of rostellar hooks is generally less variable than the size, it seems better to refer the specimen to *F. uralensis* (Clerc).

Fam. *ACOLEÏDAE.*

Genus **Gyrocoelia** Fuhrm.

Gyrocoelia fausti n.sp. (Figs. 47–53).

Host: *Lobivanellus cinereus and Rhynchea capensis.*

Locality: Peking, China.

Specimen: Pe 703 *a*, 691 *a*, 1428 *a*, 1437, 1440 *c*, 1450 *b*, 85 and 126.

Length 170 mm., maximum breadth 8 mm. Scolex 0·513 × 0·228 mm.; rostellum 0·0912 mm. diam., carrying sixty-six hooks 0·0216–0·0486 mm. long, arranged in zigzag form (Fig. 47), characteristic of *Gyrocoelia*; suckers 0·276 mm. diam.; rostellar sac short and small, posterior extremity reaching only to the posterior level of suckers; neck present, very short 0·547 × 0·091 mm. Young segments measuring 0·558 × 0·045 mm., mature 1·1 × 0·765 mm., gravid 7–8 × 2 mm. Anlage of genital organs beginning at about 10th segments behind scolex. Longitudinal bundles consisting of two concentric series on both dorsal and ventral sides: the outer of which shows 100–130 bundles, 0·017–0·091 mm. diam., each with about thirty fibres; while the inner series shows 100–120 bundles, 0·021–0·120 mm. diam., about fifty fibres, the lateral bundles smaller than the central, particularly those above and below cirrus sac. Transverse fibres in three distinct layers alternating with two layers of longitudinal muscles, but the innermost layer seems more or less feeble. Two pairs of longitudinal excretory vessels, lumen of dorsal vessels measuring 0·022 mm., of ventral 0·034 mm., each pair communicating by a transverse vessel. Cirrus pouch passing between dorsal and ventral excretory vessels. Male genital opening irregularly alternate, in front of centre of proglottis margin. Cirrus pouch 0·629 × 0·255 mm., cirrus, when protruded, 0·510 × 0·054–0·085 mm., armed with four kinds of hooklets (Fig. 50). Testes forty-two to forty-eight in number 0·051–0·114 mm. diam., seemingly grouping into two series, present in anterior segments of 1·610 × 0·850 mm. or 1·460 × 1·139 mm. Vasa efferentia conjoining with two main ducts, which are reunited and form into a simple coarse vas deferens. Internal seminal vesicle folding up in cirrus pouch. No vagina. Ovary large and broad, of two lobes, 1·275 × 0·170 mm., well developed in segments of about 2·210 × 0·340 mm. Vitelline gland bilobed 0·456 × 0·119 mm., posterior to ovary. Uterus ring-like, measuring 1·530 × 0·170 mm. in circumference. Shell gland 0·114 mm. diam., partially overlaid by vitelline gland. Eggs with two shells; external 0·064 × 0·043 mm., internal 0·043 × 0·030 mm., onchosphere 0·039 × 0·025 mm., embryonal hooklets 0·012 mm. long (Fig. 53).

Pe 1450 *b*, Pe 1428 *a*, Pe 1437, Pe 1440 *c* and Pe 126 contain the same

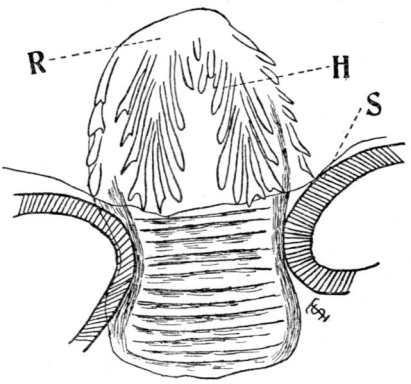
species, but in each entire strobila no testes are found, although the cirrus pouch and the female organs have developed. This form is likewise different from the genus *Dioicocestus* which is characterised by a separation of sex, provided with a single female or two male organs. Such a peculiarity was also observed by Clausen (1915) in the strobilae of *G. paradoxa* (von Linstow). Among the five female strobilae mentioned above, No. 1428 *a* mounted in balsam is a complete worm upon which the following account is based: The length of whole strobila is 137 mm. The gravid segments (eggs not well developed) measure 6·0 mm. wide by 0·595 mm. long, mature ones 3·0 by 0·34 mm. (9 : 1) and the youngest ones closely behind the scolex 0·527 mm. by 0·017 mm. The scolex is 0·084 mm. in diam. Unfortunately, the rostellar hooks are absent. The neck is present, measuring 0·408 mm. by 0·170 mm. The anlage of genital organs begins at the 8th segment; at about the 60th segment, the cirrus pouch, ovary and vitelline gland begin to differentiate; at about the 140th segment, the cirrus pouch, ovary, vitelline gland and shell gland are fully developed and the uterus is well marked at about the 250th segment. At the last segments, the uterus is filled up with developed eggs. This indicates that cross-fertilisation has taken place. In the gravid segment the cirrus pouch, in spite of being sterile, reaches the same size as that of the above mentioned double-sexed strobilae (0·627 × 0·250 mm.). Finally, all the segments found in the only female strobila are broader than long, while the anterior segments (with testes) of the double-sexed strobilae are sometimes as wide as they are long. This fact also confirms Clausen's observation of *G. paradoxa*.

Up to the present, this genus only includes five known species from five Continents, namely, *G. perversus* Fuhrm. from Europe, *G. leuce* Fuhrm., South America, *G. brevis* Fuhrm., Africa, *G. australiensis* Johnston, Australia and *G. paradoxa* (von Linstow), Asia (India). In 1922, Maplestone and Southwell described a species of the Genus *Gyrocoelia* under the name of *G. australiensis* which, for the first time was observed by Johnston, as possessing only five testes. Both material described by Johnston and by Maplestone and Southwell lack the rostellar hooks. The present species from Peking has some similarity to Mapleston and Southwell's specimen, but differs from Johnston's in the slow appearance of the uterus (see Johnston, 1912, p. 30: "the genitalia appear very early, the uterus and the other parts being recognised in the youngest segments examined") and numerous testes. Therefore, *G. australiensis* differs from the present species, and it is reasonable to create a new species for Faust's specimens from Peking.

SUMMARY.

In conclusion, the following comments may prove suggestive:

1. Out of fifty-five vials of the Chinese cestodes from Charadriiform birds, fifteen have not been determined definitely, owing to the poorly preserved condition and to insufficient material for detailed study, such as Pe 510, Pe 517,



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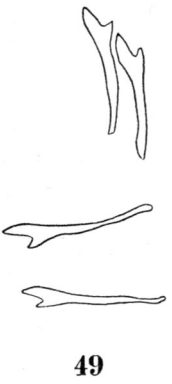

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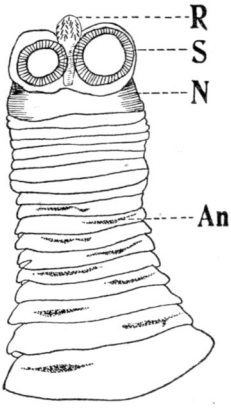

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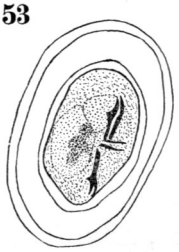

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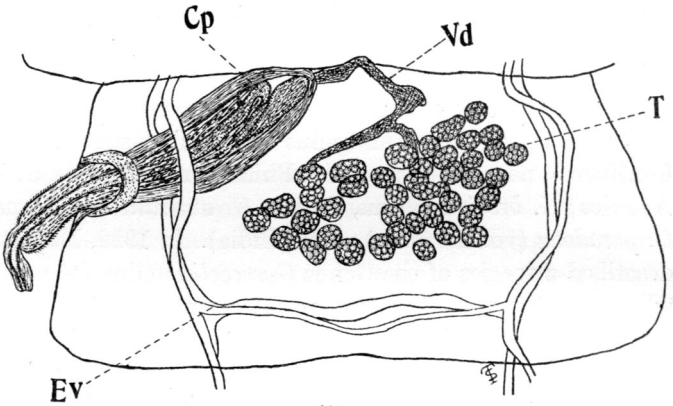

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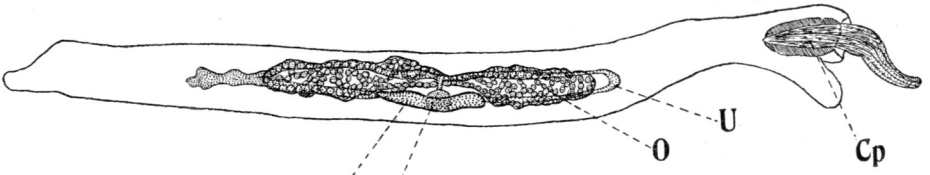

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Pe 526, Pe 529, Pe 552 *b*, Pe 588, Pe 593, Pe 1466, Pe 735 *c*, Pe 1431 *d*, Pe 760, Pe 144 *b*, Pe 151, Pe 848 and Pe 841 *d*.

2. In this paper, seven species are described as new, namely, *Amoebotaenia fuhrmanni*, *A. pekinensis*, *Monopylidium guiarti*, *Choanotaenia joyeuxi*, *Haploparaxis sinenis*, *Fuhrmanniella clerci*, and *Gyrocoelia fausti*.

3. The present study indicates, to a certain extent, that the Chinese fauna of the avian cestodes is more or less related to that of the Ural, Australia, Egypt and Europe.

Pe 848 is an interesting tapeworm recorded from the liver of *Totanus calidris*. Owing to the poor preservation, the strobilae can not be examined, but its incomplete rostellar hooks, larger 0·0234 mm., and smaller 0·0216 mm. shown in Fig. 54, are characteristic.

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Legends to Figs. 47–53.

Figs. 47–53, *Gyrocoelia fausti* n.sp. (47) Rostellum enlarged. (48) Scolex, neck and portion o strobila showing beginning of genital organs. (49) Rostellar hooks. (50) Hooklets of cirrus. (51) Mature male segment. (52) Mature female segment. (53) Mature egg.

Lettering to figures: *An.* Anlage of genital organs; *Cp.* Cirrus pouch; *Ev.* Excretory vessels; *Gv.* Vitelline gland; *H.* Rostellar hooks; *N.* Neck; *O.* Ovary; *R.* Rostellum; *S.* Sucker; *Sg.* Shell gland; *T.* Testes; *U.* Uterus; *Vd.* Vas deferens.